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REMARKS

Claims 2-15 are pending in this application. Claims 6-13 have been withdrawn. By this Amendment, the specification has been amended to correct typographical errors, claim 1 has been canceled, claims 2-8 have been amended to clarify the claimed method and amend claim dependencies, and claims 14 and 15 have been added. Support for amended claim 3 is found in original claim 3 and in the specification at paragraph [0053] and Table 2 (page 11), for example. Support for new claim 14 is found in original claim 1 and in the specification at paragraphs [0018] and [0034] and Table 1 (page 10), and Table 2 (page 11), for example. Support for new claim 15 is found in original claim 5, for example. No new matter has been added.

I. Formal Matters**A. Rejection under 35 U.S.C. §112, second paragraph**

Claims 1-5 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Applicants respectfully traverse the rejection.

The Examiner stated that claim 1 is vague and indefinite because "there are no actual positively claimed extraction steps" (Office Action, page 3). The Examiner concluded that claim 1 is "unclear and incomplete because it is missing one or more essential steps (including the omission of a final recovery step of the desired tannin product)" (Office Action, page 3).

In response, without acquiescing in the propriety of the rejection, but solely to expedite prosecution, Applicants have canceled claim 1 and added new claim 14 which sets forth extraction steps, including a final recovery step.

The Examiner stated that claim 5 is vague and indefinite due to the term "preferably" and the phrase "an extraction temperature is . . . " (Office Action, page 3). According to the

Examiner, the former fails to set forth clear claim metes and bounds, and the latter does not clearly indicate whether the temperature is actually used in the method.

In response, without acquiescing in the propriety of the rejection, but solely to expedite prosecution, Applicants have amended claim 5 to clarify the temperature range and have added new claim 15 directed to the preferred temperature range.

In view of the amendments and arguments set forth above, Applicants respectfully request that the Examiner withdraw the rejection.

B. Rejection under 35 U.S.C. § 102(b)

Claims 1-5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Cone (*Pulp and Paper Manufacturer* 19(4): 92-94 (April 10, 1956)), Tiarks et al. (*Plant Polyphenols*, Hemingway et al. (eds.), Plenum Press, New York, pp. 597-608 (1992)), Matthews et al. (*Phytochemistry* 45(2): 405-410 (1997)), Burmester et al. (*Holz als Roh- und Werkstoff* 44(11): 419 (1986) (abstract)), or Soto et al. (*Brazilian Symposium on the Chemistry of Lignins and Other Wood Components, 6th Proceedings, Guaratingueta, Brazil*, Silva et al. (eds.), pp. 401-406 (Oct. 25, 1999) (abstract from poster session)). Applicants respectfully traverse the rejection.

The Examiner stated that the references teach "the extraction of tannin from pine . . . using a lower alcohol and/or a lower alcohol/aqueous solvent" (Office Action, page 5). Despite making an *anticipation* rejection, the Examiner acknowledged that, "if not expressly taught, each of the reference solvent extraction temperatures would inherently be within the broad range instantly claimed as it would be extremely unusual within the plant tannin extraction art to use such extraction solvents outside the broad temperature range instantly claimed" (Office Action, page 5).

In order for a reference to anticipate a claim, the reference must teach every element in the claim *and* enable the method allegedly anticipated and taught by the reference. The five references cited by the Examiner fail to meet these anticipation criteria.

Cone teaches that tannins, used in leather tanning and oil well drilling fluids, may be extracted from pine using hot water or ethyl alcohol (page 93, cols. 1-2). Cone notes that the extraction of tannin, wax, and Rutin (a flavone) faces "technical problems" which are "quite difficult and [thus] some expert development work will be needed to solve them" (page 94, col. 1).

As noted above, an anticipatory reference must teach every element claimed. Cone states that tannins can be extracted using hot water or ethyl alcohol, whereas the claimed method requires tannin extraction using methanol or a lower alcohol/aqueous solvent, neither of which is mentioned by Cone. In addition, the tannins extracted in the claimed method must have a specific viscosity range in an aqueous solution. This viscosity range permits the tannins to be used as adhesives or binders as described in the specification at page 6, for example. Cone does not teach that tannins having such a viscosity range are extracted and recovered.

Moreover, as noted above, to anticipate a claim, the cited reference must enable the method allegedly anticipated and taught by the reference. The Examiner provided no indication that one of ordinary skill in the art could extract tannins from bark samples based on the extremely limited statements in the Cone reference. Cone itself supports this assertion given the fact that Cone refers to the difficulty of tannin extraction (page 94, col. 1).

Since Cone fails to teach all claimed elements and fails to enable the method allegedly anticipated and taught by the reference, Cone does not anticipate the claimed method.

Tiarks et al. teach methods of extracting condensed tannins from pine litter at various stages of decomposition. The methods require one to four absolute methanol extractions

(page 599), one absolute methanol extraction followed by one acetone:water (50:50, v/v) extraction (page 597), or two absolute methanol extractions followed by two acetone:water (50:50, v/v) extractions (pages 597 and 599). Tiarks et al. indicate that methanol:water (1:1, v/v) extraction is also known (page 598). Although various extraction solvents are described, Tiarks et al. stress that solvent selection must be carefully considered since the "solvent used can affect the amount of tannin extracted and the biological activity of the tannin" (page 598).

The claims require tannin extraction with methanol or a lower alcohol/aqueous solvent followed by tannin recovery. It is noted that Tiarks et al. mention using methanol or a methanol:water mixture for tannin extraction, however, Tiarks et al. also specifically state that, when using single extractants, "acetone-water usually is more effective than absolute methanol or methanol-water" (page 601). Thus, Tiarks et al. specifically teach away from the use of methanol or a lower alcohol/aqueous solvent in a single extraction. A reference that teaches away from a claimed invention clearly cannot anticipate that invention.

In addition, the tannins extracted in the claimed method must have a specific viscosity range in an aqueous solution. This viscosity range permits the tannins to be used as adhesives or binders as described in the specification at page 6, for example. Tiarks et al. do not teach that tannins having such a viscosity range can be recovered. Instead, Tiarks et al. describe the recovery of tannins using an extractant mixture having a 1:1 ratio of methanol:water or acetone:water. As noted in the specification, Table 2 (page 11), a ratio of lower alcohol:water of 50:50 results in an aqueous tannin solution having a viscosity range of 2000-7000 mPa/s. Thus, Tiarks et al. do not anticipate the claimed method.

Matthews et al. describe extractable and non-extractable proanthocyanidins in various tree barks. Proanthocyanidin extraction occurs using a methanol:water mixture (1:1) (page 409, col. 1). Matthews et al. state that extractable tannins are used in manufacturing leather (page 405, col. 1).

As noted above, in the claimed method, the tannins extracted must have a specific viscosity range in an aqueous solution thus, permitting the tannins to be effectively used as adhesives or binders as described in the specification at page 6, for example. Matthews et al. do not teach that tannins having such a viscosity range are recovered. In fact, Matthews et al. describe the recovery of tannins for use in manufacturing leather, wherein the extractant is a 1:1 mixture of methanol to water. As noted in the specification, Table 2 (page 11), extraction using a ratio of lower alcohol:water of 50:50 results in an aqueous tannin solution having a viscosity range of 2000-7000 mPa/s. Since Matthews et al. fail to teach every element claimed, Matthews et al. do not anticipate the claimed method.

Burmester et al. briefly describe various chemical properties of European tree barks. Bark samples were extracted with, *inter alia*, ethanol, and various bark components, including tannin, were analyzed. Neither the experimental method nor the results of the analysis are provided in the publication.

As noted above, an anticipatory reference must teach every element claimed. Burmester et al. state that tannins can be extracted using ethanol. The claimed method requires tannin extraction using methanol or a lower alcohol/aqueous solvent, neither of which is mentioned by Burmester et al. In addition, the tannin extracted in the claimed method must have a specific viscosity range in an aqueous solution. Burmester et al. do not teach that tannins having such a viscosity range are recovered.

Moreover, Burmester et al. fail to anticipate the claimed method since the Burmester et al. abstract provides no guidance regarding how to extract tannins from bark. As noted above, in order to anticipate a claimed method, the cited reference must enable the method allegedly anticipated and taught by the reference. The Examiner provided no indication that one of ordinary skill in the art could extract tannin from bark based on the extremely limited statements in the Burmester et al. abstract. Cone and Tiarks et al. support this assertion given

the fact that Cone refers to the difficulty of tannin extraction and Tiarks et al. emphasize the need for careful solvent selection.

Since Burmester et al. fail to teach all claimed elements and fail to enable the method allegedly anticipated and taught by the reference, Burmester et al. do not anticipate the claimed method.

Soto et al. state that aqueous methanol was used to extract polyflavonoids from *Pinus radiata* bark. The polyfavonoids were subsequently analyzed by chemical assays, gel-permeation chromatography, and IR spectrophotometry. Neither the experimental method nor the results of the analysis are provided in the publication.

Although Soto et al. state that tannins can be extracted using aqueous methanol, the claimed method requires tannin extraction using methanol or a lower alcohol/aqueous solvent to obtain tannins having a particular viscosity range which is not mentioned by Soto et al. As noted in the specification at page 11 (Table 2), for example, the ratio of alcohol to water can alter the viscosity. The viscosity range set forth in the claims permits the tannins to be used as adhesives or binders as described in the specification at page 6, for example. Soto et al. do not teach that tannins having such a viscosity range are extracted and recovered.

Moreover, Soto et al. fail to anticipate the claimed method since the Soto et al. abstract provides no guidance regarding how to extract tannins from bark. As noted above, in order to anticipate a claimed method, the cited reference must enable the method allegedly anticipated and taught by the reference. The Examiner provided no indication that one of ordinary skill in the art could extract tannin from bark based on the extremely limited statements in the Soto et al. abstract. Cone and Tiarks et al. support this assertion given the fact that Cone refers to the difficulty of tannin extraction and Tiarks et al. emphasize the need for careful solvent selection.

Since Soto et al. fail to teach all claimed elements and fail to enable the method allegedly anticipated and taught by the reference, Soto et al. do not anticipate the claimed method.

Regarding dependent claims 5 and 15, despite the failure of all five references to cite a single temperature within the ranges set forth in the claims, the Examiner stated that the temperatures in the claims are inherently taught by the references since the use of other temperatures "would be extremely unusual within the plant extraction art" (Office Action, page 5). However, the Examiner provided no evidence supporting this statement. Not one of the five references teaches or even suggests appropriate tannin extraction temperatures. In fact, Cone suggests that such temperatures are *not* well known given that tannin extraction is "quite difficult" and requires "expert development work" (Cone, page 94, col. 1).

In addition, the doctrine of inherent anticipation is not applicable in this situation. Inherency requires certainty, not probabilities or possibilities. Thus, a cited reference must inevitably contain the missing limitation. The Examiner has not offered any proof that the cited references inherently teach the certain use of the temperatures claimed in claims 5 and 15.

In view of the amendments and arguments set forth above, Applicants respectfully request that the Examiner withdraw the rejection.

C. Rejection under 35 U.S.C. § 103(a)

Claims 1-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cone (*Pulp and Paper Manufacturer* 19(4): 92-94 (April 10, 1956)), Tiarks et al. (*Plant Polyphenols*, Hemingway et al. (eds.), Plenum Press, New York, pp. 597-608 (1992)), Matthews et al. (*Phytochemistry* 45(2): 405-410 (1997)), Burmester et al. (*Holz als Rho - und*

Werkstoff 44(11): 419 (1986) (abstract)), or¹ Soto et al. (*Brazilian Symposium on the Chemistry of Lignins and Other Wood Components, 6th Proceedings, Guaratingueta, Brazil*, Silva et al. (eds.), pp. 401-406 (Oct. 25, 1999) (abstract from poster session)). Applicants respectfully traverse the rejection.

The Examiner stated that the references "are relied upon for the reasons discussed" above, i.e., the references teach "the extraction of tannin from pine . . . using a lower alcohol and/or a lower alcohol/aqueous solvent" (Office Action, pages 5 and 6). The Examiner concluded that it would have been obvious to one of ordinary skill in the art to adjust the concentration of lower alcohol to water for tannin extraction as such concentration determination would have been "a matter of judicious selection and routine optimization which is well within the purview of the skilled artisan (especially since it is notoriously well recognized in the art . . . that lower alcohols and/or water are effective for extracting tannin from pine)" (Office Action, page 6). In addition, the Examiner concluded that the extraction temperature recited in the claims would also have been "a matter of judicious selection and routine optimization" (Office Action, page 6).

Applicants note that the five cited references are described in detail above.

The Examiner asserted that the ratio of lower alcohol to water as claimed is a "matter of judicious selection" (Office Action, page 6). However, as described in the specification, selecting the ratio of extractant components in an extraction mixture is not necessarily straightforward. Since the ratio plays a role in determining the ultimate viscosity of the resulting tannin solution and since the intended use of the tannins is often dependent on the

¹ In the Office Action, page 5, the Examiner used the term "and" instead of the term "or." Based on the basis for the rejection, it is assumed that the Examiner applied the references in the alternative and thus, the references are addressed herein in the alternative. However, even if applied in combination, the references would not have rendered obvious the claimed invention.

viscosity, selecting the ratio is a key element of the extraction method. Tiarks et al. support this argument by stating that solvent selection must be carefully considered since the "solvent used can affect the amount of tannin extracted and the biological activity of the tannin" (page 598). Thus, it would not have been a mere matter of design choice to select the tannin extractant(s) and ratio thereof.

Regarding Tiarks et al., this reference cannot have rendered obvious the claimed method since it teaches away from the claimed method for at least two reasons. First, the claims require tannin extraction using methanol or a lower alcohol/aqueous solvent. Tiarks et al. mention using methanol or a methanol:water mixture in tannin extraction, however, they specifically state that when using single extractants, "acetone-water usually is more effective than absolute methanol or methanol-water" (page 601). A reference must be considered for all that it teaches. Thus, despite referring to methanol and methanol:water mixtures, Tiarks et al. specifically teach away from the use of methanol or a lower alcohol/aqueous solvent in a single extraction. Second, the tannins extracted in the claimed method must have a specific viscosity range in an aqueous solution. This viscosity range permits the tannins to be used as adhesives or binders as described in the specification at page 6, for example. Tiarks et al. do not teach that tannins having such a viscosity range are recovered. Instead, Tiarks et al. describe the recovery of tannins using an extractant mixture having a 1:1 ratio of methanol to water or acetone to water. As noted in the specification, Table 2 (page 11), a ratio of lower alcohol to water of 50:50 results in a viscosity range of 2000-7000 mPa/s in an aqueous tannin solution. Thus, Tiarks et al. teach away from the claimed invention by teaching the use of an extractant component ratio that does not provide the requisite viscosity range. A reference that teaches away from a claimed invention clearly cannot render that invention obvious.

Similarly, Matthews et al. do not teach that tannins having the viscosity range recited in the claims are recovered. In fact, Matthews et al. describe the recovery of tannins for use in manufacturing leather, wherein the extractant is a 1:1 mixture of water and methanol. As noted in the specification, Table 2 (page 11), a ratio of lower alcohol to water of 50:50 results in a viscosity range of 2000-7000 mPa/s in an aqueous tannin solution. Thus, Matthews et al. do not render obvious the claimed method and in fact, teach away from the claimed method.

Regarding Cone and Burmester et al., the claimed method requires extraction using methanol or a lower alcohol/aqueous solvent, neither of which is mentioned or suggested by Cone or Burmester et al. In addition, the tannins extracted in the claimed method must have a specific viscosity range in an aqueous solution. Neither Cone nor Burmester et al. teach or suggest that tannins having such a viscosity range can be recovered.

Soto et al. state that tannins can be extracted using aqueous methanol. The claimed method requires extraction using methanol or a lower alcohol/aqueous solvent to obtain tannins having a particular viscosity range which is not mentioned by Soto et al. As noted in the specification at page 11 (Table 2), for example, the ratio of alcohol to water can alter the viscosity. The viscosity range set forth in the claims permits the tannins to be used as adhesives or binders as described in the specification at page 6, for example. Soto et al. do not teach or suggest that tannins having such a viscosity range can be recovered.

Regarding dependent claims 5 and 15, despite the failure of all five references to cite a single temperature within the ranges set forth in the claims, the Examiner stated that determining extraction temperatures is a matter of "routine optimization" (Office Action, page 6). However, the Examiner provided no evidence supporting this statement. Not one of the five references teaches or even suggests appropriate tannin extraction temperatures and, in fact, Cone suggests that such temperatures are *not* well known given that tannin extraction is "quite difficult" and requires "expert development work" (Cone, page 94, col. 1).

Since the references do not teach or even suggest the particular method claimed, Applicants respectfully assert that no *prima facie* case of obviousness has been established.

In view of the amendments and arguments set forth above, Applicants respectfully request that the Examiner withdraw the rejection.

II. Miscellaneous

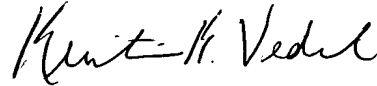
Two Information Disclosure Statements with Forms PTO-1449 were filed in the above-captioned patent application on July 25, 2002, and April 9, 2003. Applicants have not yet received from the Examiner a copy of the Forms PTO-1449 initialed to acknowledge the fact that the Examiner has considered the disclosed information. The Examiner is requested to initial and return to the undersigned a copy of the Forms PTO-1449. For the convenience of the Examiner, copies of the forms are attached.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 2-5, 14, and 15 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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JAO:KKV/hs

Attachments: Form PTO-1449 filed July 25, 2002
Form PTO-1449 filed April 9, 2003

Date: January 12, 2004

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APPLICATION NO.
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INFORMATION DISCLOSURE STATEMENT

(Use several sheets if necessary)

APPLICANTS
Yusho NAKAMOTO et al.

FILING DATE
March 19, 2002

GROUP
1651

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS
	4,490,405	12/25/1984	Horst et al.		
	5,238,680	08/24/1993	Connolly		
	5,417,888	05/23/1995	Collins et al.		

FOREIGN PATENT DOCUMENTS

DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)

EXAMINER

DATE CONSIDERED

Examiner: Initial if citation considered, whether or not citation is in conformance with M.P.E.P. 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Date: July 25, 2002